Sleep Diary

Name _____

Date begun_____

Note to students: For the period **FRI.**/*Saturday*, indicate your bedtime Friday night and your wake time on Saturday morning. Treat other time periods similarly: day in **bold** capital letters for **bedtime**; day in *italics* for *wake time*.

	FRI. *Saturday*	**SAT.** *Sunday*	**SUN.** *Monday*	**MON.** *Tuesday*	**TUES.** *Wednesday*	**WED.** *Thursday*	**THURS.** *Friday*	**FRI.** *Saturday*	**SAT.** *Sunday*	**SUN.** *Monday*	**AVERAGE**
Bedtime (to nearest quarter hour)											
Wake time (to nearest quarter hour)											
Total sleep time (hours)											
Number of awakenings during the night											
Number of caffeinated drinks	**Friday** Morning: Afternoon: Evening:	**Saturday** Morning: Afternoon: Evening:	**Sunday** Morning: Afternoon: Evening:	**Monday** Morning: Afternoon: Evening:	**Tuesday** Morning: Afternoon: Evening:	**Wednesday** Morning: Afternoon: Evening:	**Thursday** Morning: Afternoon: Evening:	**Friday** Morning: Afternoon: Evening:	**Saturday** Morning: Afternoon: Evening:	**Sunday** Morning: Afternoon: Evening:	Morning: Afternoon: Evening:

Have you been told by a family member that you snore? yes_____ no_____

Do you believe that you often have difficulty sleeping (falling asleep, awakening during the night, awakening unrefreshed)? yes_____ no_____

Master 0.1

Recording Bedtimes and Wake Times

If your bedtime is:	Record this number as your bedtime in your Sleep Diary	If you wake up at:	Record this number as your wake time in your Sleep Diary
9:30 p.m.	9.50	5:30 a.m.	5.50
10:00	10.00	5:45	5.75
10:15	10.25	6:00	6.00
10:30	10.50	6:15	6.25
10:45	10.75	6:30	6.50
11:00	11.00	6:45	6.75
11:15	11.25	7:00	7.00
11:30	11.50	7:15	7.25
11:45	11.75	7:30	7.50
12:00 a.m.	12.00	7:45	7.75
12:15	12.25	8:00	8.00
12:30	12.50	8:15	8.25
12:45	12.75	8:30	8.50
1:00	13.00	8:45	8.75
1:15	13.25	9:00	9.00
1:30	13.50	9:15	9.25
1:45	13.75	9:30	9.50
2:00	14.00	9:45	9.75
2:15	14.25	10:00	10.00
2:30	14.50	10:15	10.25
2:45	14.75	10:30	10.50
3:00	15.00	10:45	10.75

Sleepiness Scale

Name _____ Date _____

Use the following scale to assess your sleepiness at the times indicated in the table below.

Score	Description
1	feeling active and vital, alert; wide awake
2	functioning at high level, but not at peak; able to concentrate
3	not at full alertness, but responsive and awake
4	not at peak; let down; a little foggy
5	beginning to lose interest in remaining awake; slowed down; foggy
6	prefer to be lying down; fighting sleep; woozy
7	losing struggle to remain awake; sleep onset soon; or asleep

Day/Time	Sleepiness Scale Score
1st Monday	
6:00–7:00 a.m.	
10:00 a.m.	
2:00 p.m.	
4:00 p.m.	
7:00 p.m.	
10:00–11:00 p.m.	
Thursday	
6:00–7:00 a.m.	
10:00 a.m.	
2:00 p.m.	
4:00 p.m.	
7:00 p.m.	
10:00–11:00 p.m.	
2nd Monday	
6:00–7:00 a.m.	
10:00 a.m.	
2:00 p.m.	
4:00 p.m.	
7:00 p.m.	
10:00–11:00 p.m.	

Calculating Average Bedtime and Wake Time

Name _____ Date _____

To calculate an average bedtime, follow the steps below. Consider the following hypothetical data:

Day of Week	Bedtime	Bedtime (as recorded in diary)
Friday	11:45 p.m.	11.75
Saturday	1:00 a.m.	13.00
Sunday	11:00 p.m.	11.00
Monday	10:30 p.m.	10.50
Tuesday	10:45 p.m.	10.75
Wednesday	11:00 p.m.	11.00
Thursday	10:30 p.m.	10.50
Friday	11:45 p.m.	11.75
Saturday	12:15 a.m.	12.25
Sunday	11:00 p.m.	11.00

In this example, the average bedtime is calculated as the sum of the bedtimes (113.5) divided by the total number of bedtimes recorded (10). This gives an average of 113.5/10 = 11.35. Rounding this number to the nearest quarter hour (the decimals would be 0.0 for the hour itself; 0.25 for 15 minutes after the hour; 0.5 for the half hour; 0.75 for 45 minutes after the hour) gives us 11.25, or 11:15 p.m., as the approximate average bedtime.

Calculating the approximate **average time you woke up** in the morning is done in a similar way.

For your data:

Average bedtime

1. Add all bedtimes recorded in sleep diary: _____
2. Number of bedtimes recorded: _____
3. Average bedtime (line 1 divided by line 2): _____
4. Round answer on line 3 to nearest quarter hour to get average bedtime: _____

Average wake time

1. Add all wake times recorded in sleep diary: _____
2. Number of wake times recorded: _____
3. Average wake time (line 1 divided by line 2): _____
4. Round answer on line 3 to nearest quarter hour to get average wake time: _____

What Do You Know (or Think You Know) about Sleep?

Name _____ Date _____

Indicate whether you agree or disagree with the following statements by circling "Agree" or "Disagree."

1.	Everyone has a biological clock.	Agree	Disagree
2.	Drinking coffee cures drowsiness.	Agree	Disagree
3.	Safe drivers don't have to worry about being sleepy.	Agree	Disagree
4.	Nearly everyone gets enough sleep.	Agree	Disagree
5.	Being sleepy makes it hard to think straight.	Agree	Disagree
6.	Most teenagers need at least nine hours of sleep each night.	Agree	Disagree
7.	Driving makes you sleepy.	Agree	Disagree
8.	Sleep is time for the body and brain to shut down for rest.	Agree	Disagree
9.	The body quickly adjusts to different sleep schedules.	Agree	Disagree
10.	Getting one hour less sleep per night than I need will not have any effect on my daytime performance.	Agree	Disagree

Supplemental Information—What Do You Know (or Think You Know) about Sleep?

TRUE 1. **Everyone has a biological clock.** The human biological clock resides in a part of the brain called the *suprachiasmatic nucleus*, or *SCN*. It functions through a cycling of the expression of specific genes. The timing for sleep in humans is regulated by our internal biological clock.

FALSE 2. **Drinking coffee cures drowsiness.** Coffee contains caffeine, which is a stimulant. Coffee and other caffeine-containing drinks and over-the-counter medicines can be helpful, temporary remedies for sleepiness, but their effects last only a short time. If you are seriously sleep-deprived, drinking coffee is not the answer. You may still experience brief uncontrollable "naps" that last a few seconds (these are called microsleeps), even while driving. Consider what could happen if you drive while drowsy at 55 miles per hour. How far could you travel in five seconds while asleep? Keep in mind, there is no substitute for sleep to relieve sleepiness.

FALSE 3. **Safe drivers don't have to worry about being sleepy.** Sleepiness is associated with decreased alertness, and decreased alertness is not compatible with safe driving under any circumstances.

FALSE 4. **Nearly everyone gets enough sleep.** According to recent surveys, over half of the American population reports occasional sleeping difficulties. A frequent complaint is not feeling rested upon waking. The average person requires eight hours of sleep per night (adolescents need nine or more hours of sleep per night), and this is often not achieved.

TRUE 5. **Being sleepy makes it hard to think straight.** A drowsy individual does not process information as quickly or as accurately as one who is alert. The ability to split attention between multiple tasks and inputs is lost. Reaction times are decreased, and one's field of vision narrows with sleepiness.

TRUE 6. **Most teenagers need at least nine hours of sleep each night.** Teens and young adults actually need more sleep than older adults. However, changing behaviors, attitudes, and responsibilities may cause teens and young adults to sleep less than they need to. Being able to stay up late is not the same as requiring less total sleep.

FALSE 7. **Driving makes you sleepy.** Driving does not make you sleepy but only makes your actual level of sleepiness apparent. Consequently, it is better to drive during those times when you are normally alert and to avoid driving when your functioning is normally at a low level.

FALSE 8. **Sleep is time for the body and brain to shut down for rest.** Sleep is an active process involving specific cues for onset and regulation. Although there are modest decreases in metabolic rates, there is no evidence that any major organ or regulatory system in the body shuts down during sleep. In fact, some brain activities increase dramatically. During sleep, the endocrine system increases the secretion of certain hormones, such as growth hormone and prolactin. Sleep is a very dynamic process.

FALSE 9. **The body quickly adjusts to different sleep schedules.** The circadian clock attempts to function according to a normal day/night schedule, even when people try to change it. People who work night shifts naturally feel sleepy when nighttime comes. This conflict with the natural biological rhythm leads to a decrease in cognitive and motor skills. The biological clock can be reset but only by one or two hours per day. Changing certain behaviors, such as sleeping in a dark, quiet room and getting exposure to bright light at the right time, may reduce the problem. However, continued shift work will affect the quality of a person's sleep.

FALSE 10. **Getting one hour less sleep per night than I need will not have any effect on my daytime performance.** Even this seemingly small decrease in nightly sleep, if it occurs regularly, can have a significant effect on daytime performance. Many people try to correct sleep deprivation through sleep compensation. For example, many individuals will sleep later on the weekends than they do on weekdays. Sleep compensation may be qualitatively different from normal sleep, and thus not true compensation for lost sleep.

Astronaut Scenario

The scene is mission control at Space Command Central. Video and audio communications with our three astronauts in space have suddenly been lost. Communications have been out for some time, and repeated attempts by mission control technicians to fix the problem have been unsuccessful. Space Command Central would like to know if the astronauts are aware of the problem and if they are trying to fix it from their end. Unfortunately, it is supposed to be nighttime for the astronauts, and they may be asleep. What, if anything, is going on in space?

Space Command Central decides to assemble their medical team. Even though audio and video communications are out, medical telemetry (that is, data on the status of key body systems) is still being received. The engineers at Space Command Central need help interpreting all of the medical data they are receiving. Your expertise is needed to determine the state of wakefulness or sleep for each of the astronauts. If the astronauts are asleep, are they in NREM or REM sleep?

Astronaut Telemetry Evaluation Form

Space Command Medical Team Report

Name(s)_____ Date _____

Overall Evaluation: Medical telemetry for **astronaut Jordan** indicates (circle one):

wakefulness NREM sleep REM sleep data inconclusive

1. Which data were useful in making your determination, and, specifically, how were they helpful?

2. Which data were *not* helpful in making your determination, and why were they not helpful?

Overall Evaluation: Medical telemetry for **astronaut Rodriguez** indicates (circle one):

wakefulness NREM sleep REM sleep data inconclusive

1. Which data were useful in making your determination, and specifically, how were they helpful?

2. Which data were *not* helpful in making your determination, and why were they not helpful?

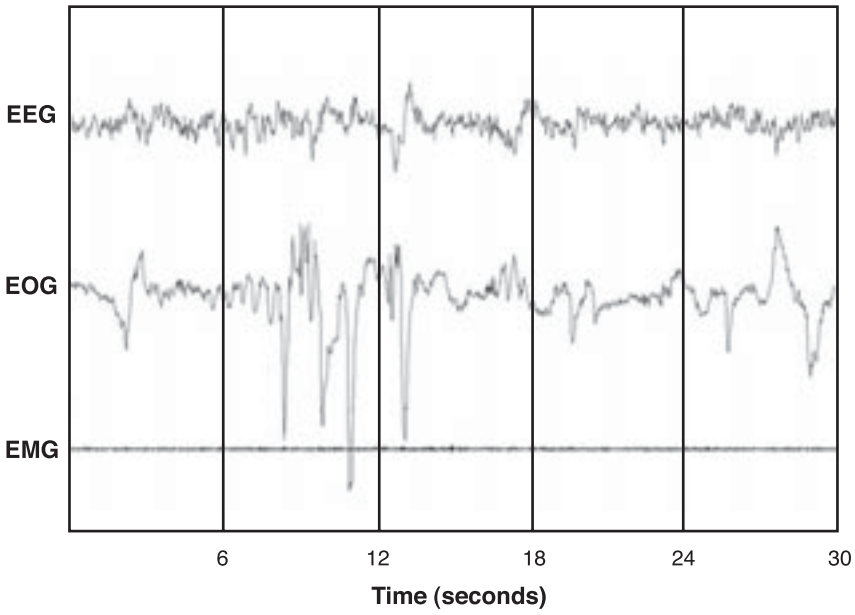
Overall Evaluation: Medical telemetry for **astronaut Chen** indicates (circle one):

wakefulness NREM sleep REM sleep data inconclusive

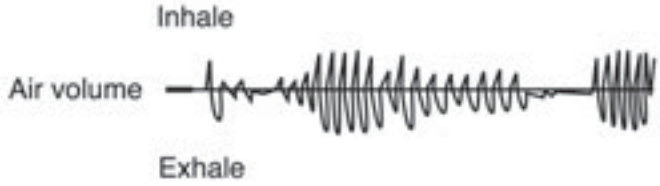
1. Which data were useful in making your determination, and specifically, how were they helpful?

2. Which data were *not* helpful in making your determination, and why were they not helpful?

Astronaut Jordan

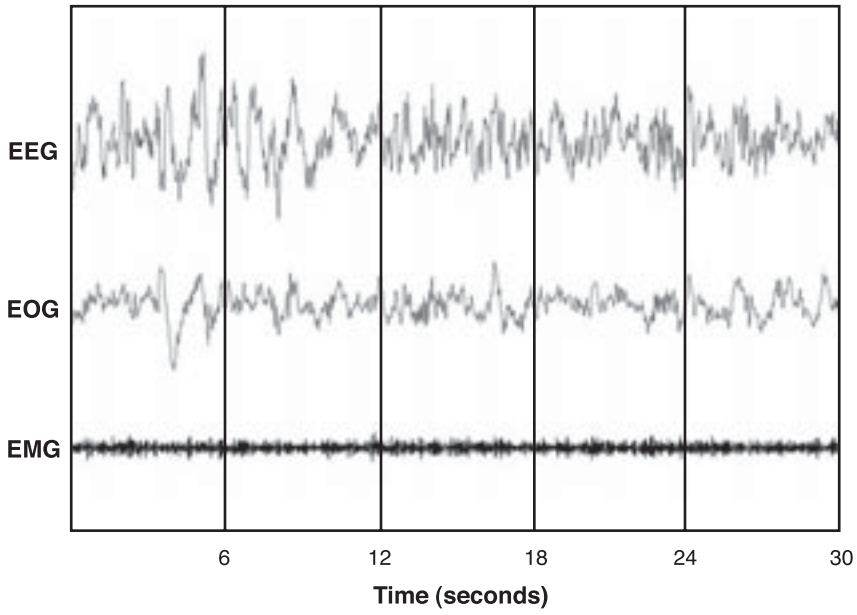


Respiration:



Body Temperature:	97.0°F 36.1°C
Heart Rate:	90 bpm
Blood Pressure:	125/85 mm Hg

Astronaut Rodriquez



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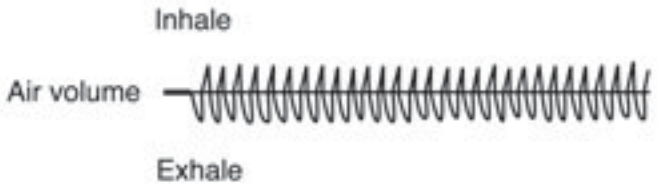
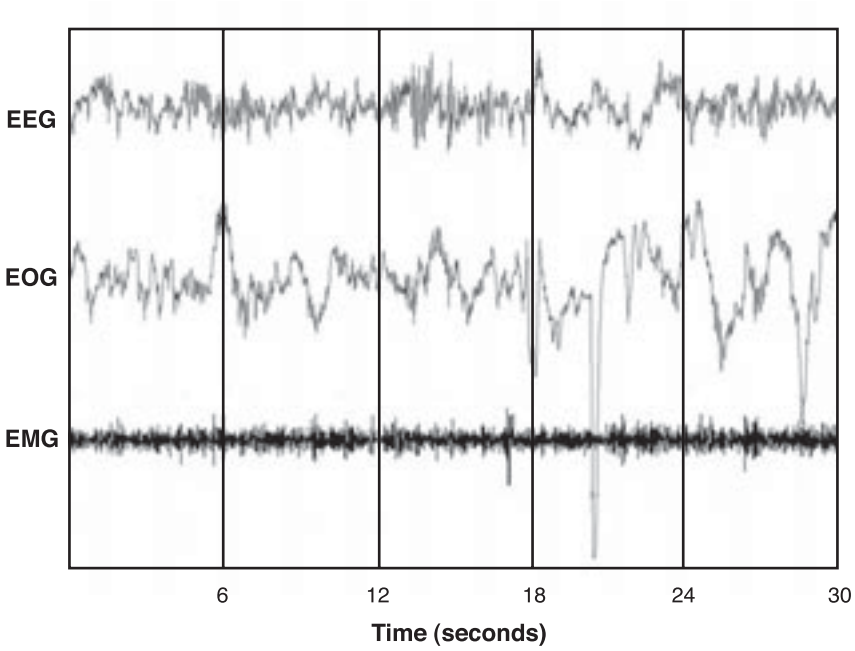
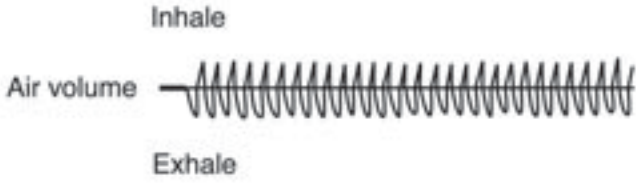


Body Temperature:	98.6°F 37.0°C
Heart Rate:	65 bpm
Blood Pressure:	115/73 mm Hg

Astronaut Chen



Respiration:



Body Temperature:	99.0°F 37.2°C
Heart Rate:	70 bpm
Blood Pressure:	110/75 mm Hg

Sleep Medicine Reference Manual

SLEEP MEDICINE REFERENCE MANUAL

Contents

Electroencephalography

Sleep is not a passive event. It is an active process involving characteristic physiological changes in the organs of the body. Scientists study sleep by measuring the electrical changes in the brain using a technique called electroencephalography (EEG). Normally, electrodes are placed on the scalp; these are usually fairly numerous and placed in a symmetrical pattern, as seen in the figure.

They measure very small voltages that are thought to be caused by synchronized activity in very large numbers of synapses (nerve connections) in the cerebral cortex. EEG data are represented by curves, which are classified according to "rhythm." The wavy lines of the EEG are what most people know as "brain waves."

Electromyography

Scientists measure the electrical activity associated with active muscles, using electromyography (EMG). This is accomplished by placing electrodes on the skin overlying a muscle. In humans, an EMG is generally recorded by placing electrodes under the chin, since muscles in this area demonstrate very dramatic changes during the various stages of sleep. Electrodes may also be placed on the lower leg.

Electrooculography

If an electrode is placed on the skin near the eye, changes in voltage are measurable as the eye rotates in its socket. This produces an electrooculogram (EOG).

Sleep Stages

Sleep is a highly organized sequence of events that follow a regular cycle each night. For instance, the EEG, EMG, and EOG patterns change in predictable ways several times during a single sleep period. Study of these events has lead to the identification of two basic stages, or states, of sleep: non–rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. Physiologic characteristics, such as body temperature, blood pressure, heart rate, respiration, and hormone release, are also different during wakefulness, NREM sleep, and REM sleep.

NREM sleep, also known as slow wave (SW) sleep, is subdivided into four stages according to the amplitude and frequency of brain wave activity, eye movements, and voluntary muscle activity that typify each substage. Generally, these four stages differ primarily in their EEG patterns, while the general physiology of these stages is fairly similar. Therefore, in this manual, emphasis will be on NREM sleep in general, and not on its individual substages.

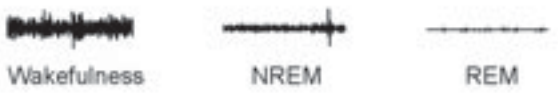
Sleep Stages, continued

Sleep is a cyclical process. During sleep, people experience repeated cycles of NREM and REM sleep, beginning with an NREM phase. This cycle lasts approximately 90 to 110 minutes and is repeated three to six times per night. As the night progresses, however, the amount of NREM sleep decreases and the amount of REM sleep increases. The term ultradian rhythm (that is, rhythm occurring with a periodicity of less than 24 hours) is used to describe this cycling through sleep stages.

EEG

Wakefulness and REM-stage sleep are both characterized by low-amplitude, random, fast wave patterns. In contrast, NREM-stage sleep is characterized by high-amplitude, slow waves.

EMG



During wakefulness, the EMG may vary between moderate and high, depending on the activities in which the individual is engaged. EMGs in NREM-stage sleep are moderate to low. In REM-stage sleep, voluntary muscle activity is inhibited and the EMG is virtually absent.

EOG

During wakefulness, rapid eye movements may be very frequent or scarce, depending on the extent to which vision is being used. Eye movement is absent during NREM, although some brain activity may be picked up by the testing equipment and be recorded incorrectly as eye activity. During REM-stage sleep, there are bursts of rapid eye movements, in between which there are periods of no eye movements.

Hypnograms

Hypnograms were developed to summarize the voluminous chart recordings (EEG, EMG, and EOG) that are made when recording electrical activities occurring during a night's sleep. As a simple graphic, they provide a simple way to evaluate data that would originally have been collected on many feet of chart paper or stored as a large digital file on a computer. This hypnogram summarizes how a typical night's sleep for a young, healthy adult is organized into stages.

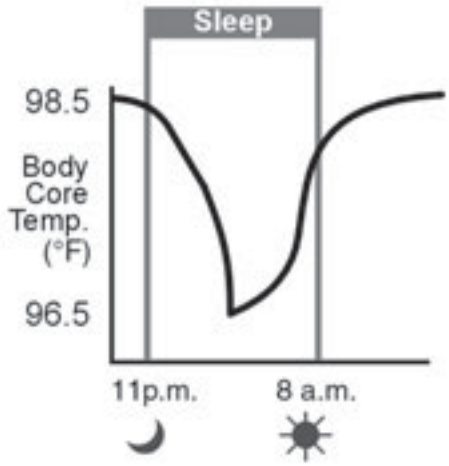
Heart Rate

During wakefulness, heart rate (in beats per minute, or bpm) can vary considerably depending on the level of activity in which the individual is engaged. During NREM-stage sleep, the heart rate exhibits less variability and may be slightly lower than what is observed during resting or less active wakefulness. Heart rate during REM-stage sleep exhibits pronounced changes and may rise to levels seen during moderate to strenuous exercise.

Body Temperature

Body temperature is relatively constant during wakefulness. However, it is maintained at a lower set point during NREM-stage sleep, thus resulting in a lower body temperature during NREM as compared with wakefulness. Body temperature is not regulated during REM-stage sleep, and it will drift toward the environmental temperature.

There also is a biological clock–related component to body temperature. This means that the body temperature will vary in a regular way with the time of day. For instance, body temperatures will be higher at midafternoon and reach their low point in the early morning hours before awakening, as seen below.



Blood Pressure

During wakefulness, blood pressure can vary considerably, for instance, with activity and stress levels. Blood pressure tends to decrease slightly during NREM-stage sleep and exhibits less variability. During REM-stage sleep, blood pressure is highly variable and may occasionally increase up to 30 percent over the resting level. During REM sleep, the diameter of blood vessels decreases (that is, they undergo vasoconstriction), which may be the cause of the rise in blood pressure.

Respiration

During wakefulness, respiration may vary with activity, stress, and emotional levels. During NREM-stage sleep, breathing slows, and the inhalation and exhalation of air decrease in magnitude compared with those of wakefulness. Breathing during NREM sleep is generally very regular. In REM-stage sleep, breathing can be very irregular.

Michel Siffre Story

How did you celebrate the new millennium? Like many of you, Frenchman Michel Siffre rejoiced in a New Year's celebration. Yet unlike most of you, Michel celebrated three days late!

Michel Siffre, a 61-year-old cave explorer, descended 2,970 feet into a cave located in southern France as part of an experiment. In this deep cave, Michel lived for two months with no contact with the outside world. He had no instrument to measure the time of day. He found it difficult to keep track of time while living without cues of any kind to help him tell if it was day or night. While in the cave, Michel used artificial light to read novels and journals and to cook. Of course, he napped. The naps were the key to throwing off Michel's sense of time.

Scientists were (and still are) interested in learning about human sleep patterns. They wanted to study Michel's sleep habits while he was in the cave. Michel wore electrodes on his body that allowed scientists at the cave opening to monitor his sleep. They observed that Michel's sleep/wake cycles varied considerably. His "day" (the time between major sleep periods) varied between 18 and 52 hours (average "day" = 27.5 hours). Scientists are using information from monitoring Michel and from other experiments to help astronauts follow healthy sleep habits during long space voyages.

This was not Michel's first journey underground for a great length of time. He spent two months in a cave on the French-Italian border in 1962, and another 205 days in a Texas cave in 1972.

The Rhythms of Sleep

The Biological Clock

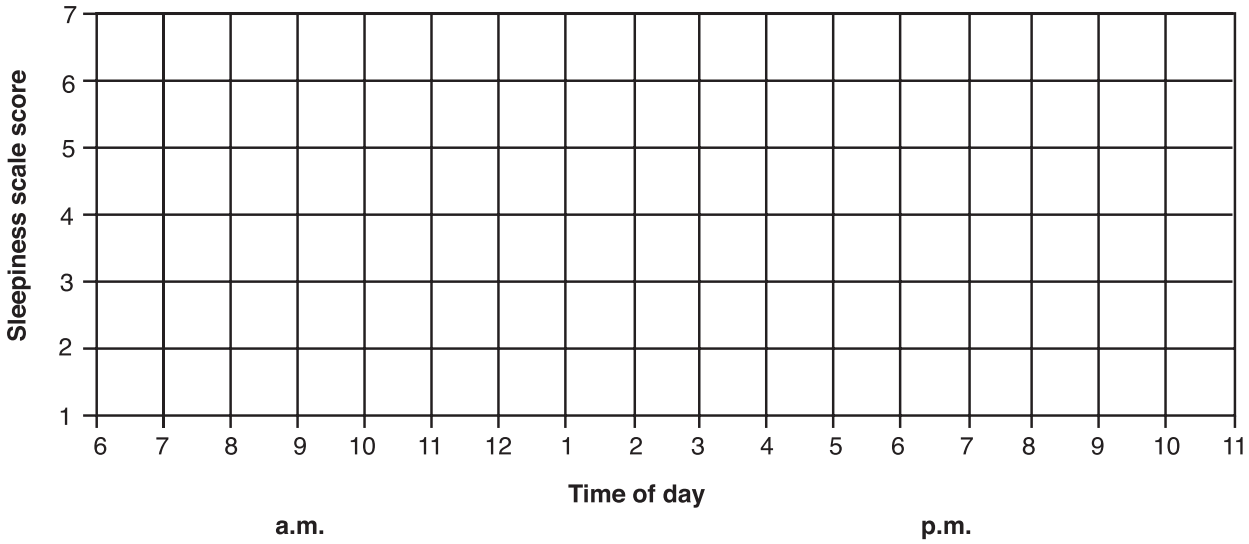
The timing for sleep in humans is regulated by our internal biological clock. Biological clocks are not like other clocks with which we are all familiar. Rather, they are physiological systems that allow organisms to live in harmony with the rhythms of nature, such as day/night cycles and the changing of seasons. The most important function of our biological clock is that it regulates our sleep/wake cycle. Our clock, because it cycles once per day, is called a *circadian clock*. In humans, this clock is located in a very small area of the brain called the *suprachiasmatic nucleus* (SCN). The SCN receives light signals from the retina, interprets them, and sends signals to another area of the brain, the pineal gland, to release hormones that affect our sleep/wake cycle. Clock genes maintain the clock cycle by directing the synthesis of proteins that slowly enter the cell nucleus and turn off the clock genes. Over a period of about 24.5 hours, these proteins break down and the genes become active again. This type of biochemical cycle is called a *negative feedback loop*.

Resetting the Clock

The circadian clock in humans actually cycles at just over 24 hours. This means that the clock must be reset to match the environmental photoperiod (that is, the light/dark, or day/night, cycle). The cue for resetting the clock is light. Light receptors in the eye transmit signals to the SCN, which in turn directs the pineal gland to secrete a hormone called *melatonin*. Melatonin levels rise during the night and decline at dawn. The rhythmic secretion of hormones such as melatonin influences our sleepiness. If the clock fails to reset properly, it becomes out of sync with the environment and can produce various problems such as jet lag, seasonal affective disorder, and Monday morning blues.

Sleepiness Scale Graph Template

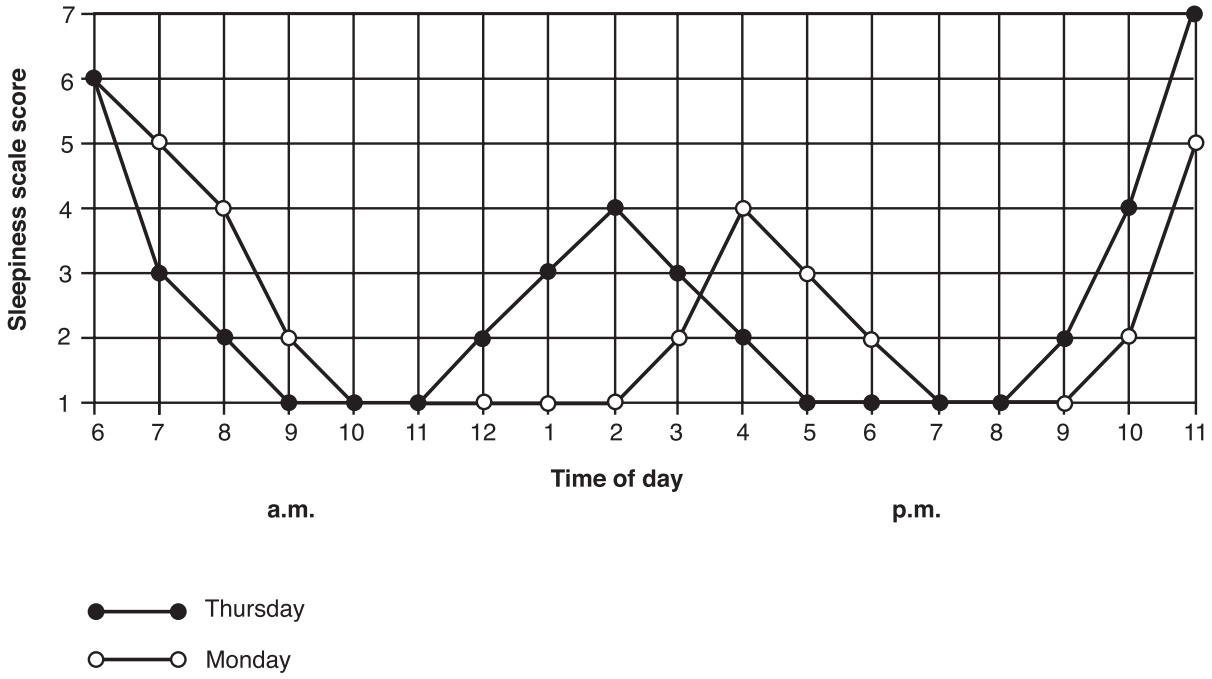
Name_____ Date_____



Thinking about Sleepiness and Sleep Cycles

Name_____ Date_____

1. The graph below contains sleepiness scale data from an individual who recorded entries every waking hour during a Monday and a Thursday. Describe how the data for Monday differ from those for Thursday. Can you suggest an explanation for this difference?



2. During the past several activities, you have learned about different types of cycles associated with sleep. List three different cycles and provide a brief description of each one.

Snoring—Believe It or Not!

A burglar was in the process of robbing an apartment when the occupants came home. He quickly hid under the bed, where he remained while the occupants went about their business. Later that day, the occupants heard a strange noise. They tracked the noise to their bedroom, where they discovered the burglar asleep under their bed and snoring like a chain saw. The police were called and the burglar was arrested.

Did you know—in Massachusetts, snoring is prohibited unless all bedroom windows are closed and locked securely?

In Davis, Calif., a city ordinance prohibits noise pollution. This law was meant to prevent college students from having loud parties. However, the Davis Police Department also enforced it against a woman whose duplex neighbor complained that she snored too loudly (the neighbors' bedrooms had an adjoining wall). The case made national headlines, and the Davis City Council promptly passed a resolution that loud snoring was not prohibited under the ordinance.

According to the *Guinness Book of World Records*, a man in Great Britain holds the record for loudest snore, rated at 92 decibels. For comparison, heavy traffic is rated at 80 decibels and a loud shout, at 90 decibels.

Snoring Survey

Name_____ Date_____

Question 1. How common is snoring?

Question 2. What is snoring?

Question 3. Is snoring a normal part of sleeping, or is it an indication of a medical problem?

Question 4. Is snoring associated with sleeping problems, that is, with sleeping disorders?

Question 5. Are sleep disorders life threatening, or are they just annoying?

Question 6. Have you, or a member of your family, ever experienced a sleep disorder?

Case History 1

Case History 1
Primary Information: The patient is a female in her mid-20s. She reports difficulty staying awake while away at college. In fact, while in high school, her teachers complained of her falling asleep during class. Her mother also had this problem, although she never sought help from a specialist.

The patient feels excessively sleepy during the day. She also reports that her dreams are very vivid, especially during naps. At times, she's not sure if she's dreaming or if something is actually happening to her. Additionally, she describes feeling like she's glued to her bed when she first wakes in the morning. Finally, she mentions that she feels weak when she laughs or is tickled.

Case History 1
Secondary Information: When examined in a sleep laboratory, it was found that this patient fell asleep relatively quickly and entered into REM sleep within 10 minutes after sleep onset.

Case History 1
Discussion Questions

1. Why is it important to consider that the patient's mother reportedly had a similar problem?

2. Of what significance is it that this patient's problems began during her teen years?

3. Is it important that this patient experienced feeling weak when laughing or being tickled?

Case History 2

Case History 2
Primary Information: The patient is the CEO of a large corporation. He reports that he suffers from excessive fatigue and sleepiness during the day. He often has had difficulty concentrating and performing his routine tasks. He has even dozed off in the early afternoon while sitting at his computer. His wife reports that he snores, although she indicated that his breathing appears normal during sleep. She has never witnessed any unusual events during the night. He is seeking help because he is concerned about being sleepy during his afternoon work hours.

Case History 2
Secondary Information: A physical exam of this patient reveals no significant problems. With further questioning, the patient discloses that he drinks several cups of coffee and has several diet colas in the afternoon to increase alertness. He also states that he often drinks an alcoholic beverage or two before bedtime. He sleeps soundly during the first part of the night, but he then awakens and has difficulty going back to sleep.

Case History 2
Discussion Questions

1. Why is it important that the patient's wife confirms that, although he snores, his breathing is normal during sleep?

2. The wife never witnessed any unusual events while the patient was asleep. What "unusual events" might she have noticed?

3. How would you suggest that this patient improve his sleep hygiene?

Case History 3

Case History 3
Primary Information: This patient is a female in her early 30s. Her medical history is unremarkable for any major problems or diseases. She indicates that she has no sleep problems of which she is aware, although she did sleepwalk as a child but not beyond age 10. She falls asleep readily, does not believe she snores, and generally awakens feeling refreshed. She has no bed partner to provide confirmation of sleep behaviors. She seeks help because of two recent incidents. In the first, she awoke at 3:30 a.m. to find herself on the roof of her house, apparently having climbed a ladder to get there. She stated that during the day she had been concerned about a tree branch that was rubbing on her roof but had forgotten about it that night. When she awoke on the roof, she thought she had just dreamed about climbing a ladder and inspecting the tree branch. The second incident occurred five weeks later. The patient reported having a good day and falling asleep readily. She awoke at 4:00 a.m. sitting under a favorite tree in a nearby park and drinking a glass of wine. Upon awakening in the park, she thought she had been dreaming about being on a picnic with her boyfriend.

Case History 3
Secondary Information: Patient history indicates no injuries to the head, no seizures, and no fainting. Her childhood and teen years were normal in all regards. No family members have ever had sleep-related experiences similar to hers. She is deeply concerned about her safety and the safety of others. What if she were to "dream" that she was driving a car?

Case History 3
Discussion Questions

1. The patient reports these episodes occurring at 3:30 a.m. and 4:00 a.m. Is this important?

2. In general terms, what would you expect this patient's EMG during sleep to look like if she is experiencing REM motor behavior disorder and not sleepwalking?

Case History 4

Case History 4
Primary Information: This patient is a male in his early 30s. His wife has made him seek help, although he doesn't see the need. He reports that he has no trouble falling asleep. However, he has multiple awakenings during the night and does not know why. He awakes feeling unrefreshed. He experiences excessive daytime sleepiness. A physical exam is performed. This patient is 6 feet tall and weighs 255 pounds. His neck measures 21 inches. Two years ago, he weighed 200 pounds.

Case History 4
Secondary Information: The patient indicates that he does snore and that he awakens with his mouth feeling very dry. An interview with the patient's wife reveals that the patient will stop breathing for up to 30 seconds. This is followed by a loud snort. The patient is also known to snore when lying flat, lying on his side, or sitting up.

Case History 4
Discussion Questions

1. Why is it significant that the patient has gained 55 pounds in the past two years?

2. Why do patients with sleep apnea wake up feeling unrefreshed?

3. Would you expect naps to be helpful in treating obstructive sleep apnea?

Case History 5

Case History 5
Primary Information: The patient is an 18-year-old male who reportedly has trouble sitting in class. He complains of feeling tired during the day and of not being able to get to sleep at night. His mother reports that he does not settle down at night to do his homework. His teachers consider him to be bored, hyperactive, and disruptive in class.

Case History 5
Secondary Information: The patient complains that he feels like bugs are crawling under his skin on his arms and legs.

Case History 5
Discussion Question

1. Why is it significant that the patient has difficulty in the classroom?

Sleep Specialist's Evaluation Form

Name_____ Date_____

From Primary Information	**Case history number _____**	**Case history number _____**
Key aspects		
Initial diagnosis		
Matching symptoms		

After reading Secondary Information

Is your initial diagnosis confirmed?	❑ yes ❑ no	❑ yes ❑ no
If no, what is your new diagnosis?		
If no, what caused you to change your diagnosis?		
Recommended treatment		
Expected outcome (effect of treatment on patient symptoms)		

Sleep Disorders Reference Manual

Introduction: Sleep is a behavioral state that is a normal part of every individual's life. In general, we spend about one-third of our lives asleep. Problems with sleep are widespread. A 1999 poll conducted by the National Sleep Foundation found that most Americans are sleep deprived, getting on average one hour less sleep per night than the eight hours that are recommended. Sleep problems affect the ability to think, to perform, and to remain healthy.

Problems with sleep can be due to lifestyle choices and can result in problem sleepiness, that is, feeling sleepy at inappropriate times. Environmental noise, temperature changes, changes in sleeping surroundings, and other factors may affect our ability to get sufficient restful sleep. Short-term problem sleepiness may be corrected by getting additional sleep to overcome the sleep deficit. In other cases, problem sleepiness may indicate a sleep disorder requiring medical intervention. More than 70 sleep disorders have been described. This manual describes some of them, listed in alphabetical order.

Insomnia: This is the most prevalent sleep disorder. Insomnia is the perception of inadequate sleep due to difficulty falling asleep, waking up frequently during the night, waking up too early, or feeling unrefreshed after waking. Insomnia is more common in women than men and tends to increase with age. Short-term and transient (that is, it comes and goes) insomnia may be caused by emotional or physical discomfort, stress, environmental noise, extreme temperatures, or jet lag, or it may be the side effect of medication. Chronic insomnia may result from a combination of physical or mental disorders, undiagnosed or uncontrolled sleep disorders (such as sleep apnea, restless legs syndrome, narcolepsy, or circadian rhythm disorders), and effects of prescription or nonprescription medications.

Treatments: Treatment is generally tailored to meet the needs of the individual. First, any medical or psychological problems must be identified and treated. Additionally, behaviors that may contribute to or worsen insomnia must be identified. Treatment may include behavioral modification (such as learning to relax or learning to associate the bed and bedtime with sleep), following good sleep hygiene practices (such as following a specific nighttime routine, reducing caffeine and alcohol intake, or reducing afternoon napping), and light therapy.

Pharmacological treatments may alleviate symptoms in specific cases. Some individuals try to overcome the problem of insomnia by drinking alcohol-containing beverages. Alcohol inhibits REM sleep, disrupts sleep during the last part of the night, and does not promote good sleep.

Narcolepsy: Narcolepsy is a chronic sleep disorder that usually becomes evident during adolescence or young adulthood and can strike both men and women. In the United States, it affects as many as 200,000 people, although fewer than 50,000 are diagnosed. The main characteristic of narcolepsy is excessive and overwhelming daytime sleepiness (even after adequate nighttime sleep). A person with narcolepsy is likely to suddenly become drowsy or fall asleep, often at inappropriate times and places. Daytime sleep attacks may occur with or without warning and may be irresistible. In addition, nighttime sleep may be fragmented. Three other classic symptoms of narcolepsy, which may not occur in all people with the disorder, are cataplexy (sudden muscle weakness triggered by emotions such as anger, surprise, laughter, and exhilaration), sleep paralysis (temporary inability to talk or move when falling

asleep or waking up), and hypnagogic hallucinations (dreamlike experiences that occur while dozing or falling asleep). People with narcolepsy can fall asleep quickly at any time during any activity. Narcolepsy is not the same as simply becoming tired or dozing in front of the TV after a day's work.

Treatments: Although there is no cure yet for narcolepsy, treatment options are available to help reduce the various symptoms. Treatment is individualized depending on the severity of the symptoms, and it may take weeks or months for the best regimen to be worked out. Treatment is primarily through medications, but lifestyle changes are also important. Medications for narcolepsy have unpleasant side effects and some patients opt to take frequent naps, allowing them to reduce the dosages of their medications. Recently, researchers discovered a gene for narcolepsy in dogs, which opens the door to identifying narcolepsy gene in humans. This may lead to developing new treatments and possibly a cure for this disabling sleep disorder.

Obstructive Sleep Apnea: Obstructive sleep apnea (OSA) is a serious disorder of breathing during sleep that is potentially life-threatening. OSA is characterized by a repeated collapse of the upper airway during sleep and, as a result, the cessation of breathing. These breathing pauses may occur 20 to 30 times per hour throughout the night, and each one may last from 10 seconds to 2 minutes. This decreases the amount of oxygen available to the sufferer. Virtually all sleep apnea patients have a history of loud snoring, although not everyone who snores has OSA. They also have frequent arousals during the night, resulting in excessive daytime sleepiness. It is estimated that approximately 12 million Americans have OSA, which can occur in children as well as adults.

People at high risk for OSA are those who have chronic, loud snoring and excessive daytime sleepiness and are observed to have gasping, choking, or no-breathing episodes during sleep. Additional risk factors include obesity and high blood pressure. Also, people who have OSA are at special risk for developing high blood pressure, which is a major risk factor for cardiovascular diseases.

Treatments: The most common treatment is **c**ontinuous **p**ositive **a**irway **p**ressure, or CPAP. This procedure involves wearing a medical mask over the nose during sleep. The mask is connected to a hose that is connected to a unit that produces a constant push of air. The flow of air can be controlled so that the nasal passages and the trachea don't collapse during sleep. Surgical procedures may be used to enlarge the nasal cavity, correct a physical problem like a deviated septum, or remove excess tissue in the throat (including tonsils). Also helpful may be behavior modification, including weight loss, avoiding alcohol before sleep, and avoiding an on-the-back sleeping position.

Parasomnias: These arousal disorders are characterized by behaviors and experiences that occur during sleep. Generally, though not always, they are mild and occur infrequently. Two examples of parasomnias are provided.

1. ***Sleepwalking* (*somnambulism*):** This disorder is characterized by walking or moving about during sleep. Objects may be carried from one place to another for no apparent reason. These behaviors occur during NREM sleep, typically in the first third of the night. Sleepwalking is more common in children than in adolescents or adults. Children affected by sleepwalking usually have no memory of such events. Sleepwalking is more common in children whose families have a history of this behavior. This suggests that genes play a role in this sleep disorder.

Treatments: Those suffering from sleepwalking may do the following:
- Get enough rest, since being overtired can trigger a sleepwalking episode.
- Unwind before bedtime, because stress also can trigger sleepwalking.
- Maximize the safety of the sleeping environment.
- Consult a specialist for a complete evaluation.

2. ***REM Motor Behavior Disorder:*** Patients with this sleep disorder, which occurs during REM sleep, experience episodes in which they act out some or all of their dreams. The dreams generally are vivid, intense, and action-packed, and they may be violent. More than 85 percent of those with this disorder are older men (the average age of onset is in the early 50s), although it can affect both females and males of any age.

   Treatments: Medication and ensuring a safe sleeping environment.

Restless Legs Syndrome: Restless legs syndrome (RLS) is a neurologic movement disorder that is often associated with a sleep complaint. RLS may affect up to 15 percent of the population. People with RLS suffer an almost irresistible urge to move their legs, usually due to disagreeable leg sensations that are worse during inactivity and often interfere with sleep. RLS sufferers report experiencing creeping, crawling, pulling, or tingling sensations in the legs (or sometimes the arms), which are relieved by moving or rubbing them. Sitting still for long periods becomes difficult; symptoms are usually worse in the evening and night and less severe in the morning. Periodic leg movements, which often coexist with restless legs syndrome, are characterized by repetitive, stereotyped limb movements during sleep. Periodic limb movement disorder can be detected by monitoring patients during sleep.

Treatments: Some people with mild cases of restless legs syndrome can be treated without medication through exercise, leg massages, and by eliminating alcohol and caffeine from the diet. Others may require pharmacological treatment, and it may take some time for the right medication or combination of medications to be determined for the individual.

Good and Bad Sleep Habits

Name_____ Date_____

Good Sleep Habits	Bad Sleep Habits

Newspaper Articles

The Gotham Daily Herald

SPECIAL EDITION

State Senator's Daughter Dies in Auto Crash

Marcia Sinton, 16, daughter of State Senator Otis Sinton, was killed in a two-car crash on the State Beltway at 3:00 p.m. yesterday. Police said that a car driven by Thomas Meecham, 19, crossed the median and struck Ms. Sinton's vehicle. Mr. Meecham, returning home after completing a 10-hour shift at work, said, "I don't know what happened. Before I realized it, I was in the other lane with a car coming right at me."

Mr. Meecham was injured in the crash and was taken to Memorial Hospital, where he is listed in serious condition. At this time, no charges have been filed pending completion of the investigation.

A spokesperson for Senator Sinton said he was out of town, but had been informed of his daughter's death and was returning home in the morning. Ms. Sinton was an honor student at North High School.

The Gotham Daily Herald

MORNING EDITION

Governor Wages War on Drowsy Drivers

Governor Shawn Smithers has taken a bold and controversial step toward making our state's roads and highways safer from drowsy drivers. He proposes to require prospective drivers to display a basic knowledge about sleep.

Many believe this action was prompted by the recent death of Marcia Sinton, daughter of State Senator Otis Sinton, a close friend. Citing recent reports, Governor Smithers said, "There are far too many crashes on the road that are caused by sleepy or sleeping drivers." The governor then outlined his plan. "I want those citizens of our state who drive to know something about sleep, what it is, and what it takes to ensure that they do not drive while drowsy." The governor indicated that he is asking a panel of sleep specialists to prepare a list of questions about sleep to include on the new state driver's license test next year.

According to the governor's proposal, anyone applying for or renewing a driver's license must be able to correctly answer a series of sleep-related questions. "Sleep-related crashes cost us too much as a society—too many lives lost and too much money spent unnecessarily—and I intend to do something about it," he said emphatically.

Memo from the Governor

From the Office of Governor Shawn Smithers

To: Member, Committee for Sleep Questions

I am calling on you, as a sleep specialist and a member of the Committee for Sleep Questions, for your assistance. Please submit to my office a list of 10 questions about sleep that will be included on our state driver's license test. The questions should test an applicant's knowledge of basic sleep concepts; for example, what is sleep, why do we need it, how much is enough, how do we get good sleep, and what are the effects of sleep loss? I think you get the basic idea; after all, you are the expert. The committee chairperson will provide you with further instructions. My office has compiled the following statistics for use by your committee. Thank you for your assistance in this important matter.

Shawn Smithers

Facts about drowsy driving in the United States:

1. There are about 100,000 police-reported crashes per year where driver drowsiness is a principal cause.
2. About 4 percent of all crash fatalities are sleep related.
3. At least 71,000 people are injured each year in crashes involving driver drowsiness.
4. At least 1 million crashes (about one-sixth of the total) are caused by lapses in driver attention; such lapses are associated with lack of sleep.

Who is at risk?

1. Drivers who are sleep deprived or fatigued.
2. Young drivers:
   - A North Carolina study found that 55 percent of sleep-related crashes involved drivers between the ages of 16 and 25; 78 percent were males.
3. Shift workers who work nights or long, irregular hours:
   - 25 million Americans are rotating-shift workers.
   - 20 to 30 percent of them report having a sleep-related driving mishap within the prior year.
4. Commercial drivers, especially truck drivers:
   - They drive high numbers of miles per year.
   - Many must drive at night.
   - Studies find that driver fatigue is associated with 30 to 40 percent of all heavy truck crashes.
5. People with untreated sleep disorders:
   - Untreated chronic insomnia, sleep apnea, and narcolepsy can lead to excessive daytime sleepiness.
   - Sleep-related problems affect 50 to 70 million Americans.